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The Quantitative Easing effect on US economy and spill overs to Emerging Markets

Bachelors thesis

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1. Abstract

This paper examines the effects of unconventional monetary policies (QE) by the US Federal Reserve on US economy and Emerging Markets. The paper finds evidence of possible transmission channels of QE to Emerging Markets, including confidence channel, bank credit risk channel, government spending and portfolio rebalancing channel. With confidence channel and portfolio rebalancing channel arguably having had the biggest effects.

This paper finds capital inflows from developed markets to emerging markets increasing through the whole QE period, and then somewhat logically we saw those inflows turning into outflows during the talks about tapering of QE program. The evidence showed that protecting factors for capital outflows were larger financial market and tighter relations to developed countries.

My study additionally includes a case study on India's markets, with focus on the effects that QE has had on the India's economy. The effect of federal funds rate and QE purchases on the Indian repo rate suggest that unconventional monetary policies have effects on India and possibly other EM's as well. Furthermore, tapering talks by Federal Reserve in early 2013 had the biggest negative effects on inflows of capital from developed countries to India.

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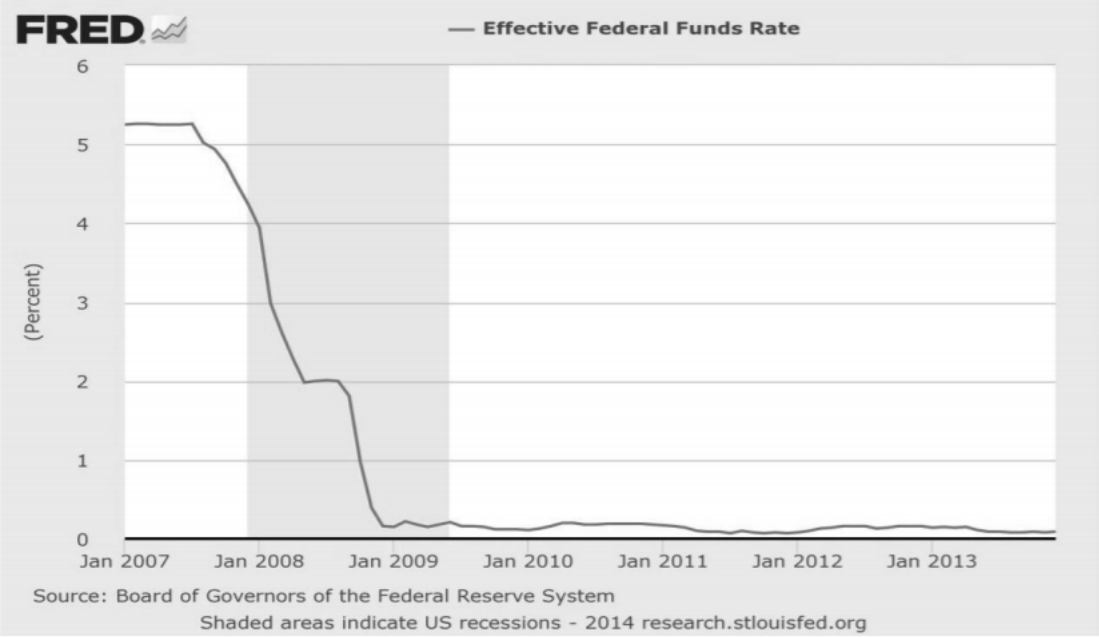
2. Introduction

2.1 The evolution of Quantitative easing

After the great recession in 2007, US Federal Reserve (Fed) found itself in a new position - The Fed had cut its interest rates drastically, reaching the zero-lower bound (LBZ) by the end of 2008 (Chart 1). As of then they could not practice the traditional monetary policy by cutting rates anymore. That was when new measures were urgently needed to provide financial stimulus, thus the Fed started a large-scale asset purchase program (LSAP) which is more widely known as the Quantitative Easing program (QE). They took influence from Japan in early 2000's, which was when these unconventional monetary policies were first introduced as Japan was fighting the aftermath of dot com bubble. The experiment from Japan's central bank was thought to be a failure and their goals for QE program were not reached, so they decided to end the experiment soon after it started. It wasn't until 2008 when the Federal Reserve decided to take their turn in trying to succeed where the Japanese had failed. Although, many commentators saw this as an act of desperation from the Fed and it was seen as the "last battle station" to fight the notorious 2008 crisis. During the first QE period Fed bought up long term treasury and agency bonds and mortgage backed securities, which goal was to lower long-term interest rates while short-term rates were stuck at the LBZ. This was a new territory for the Fed and understandably sparked debates across the financial world. Later they discovered that there seemed to be many more channels where QE influenced the financial sector.

The Effective Federal Funds rate

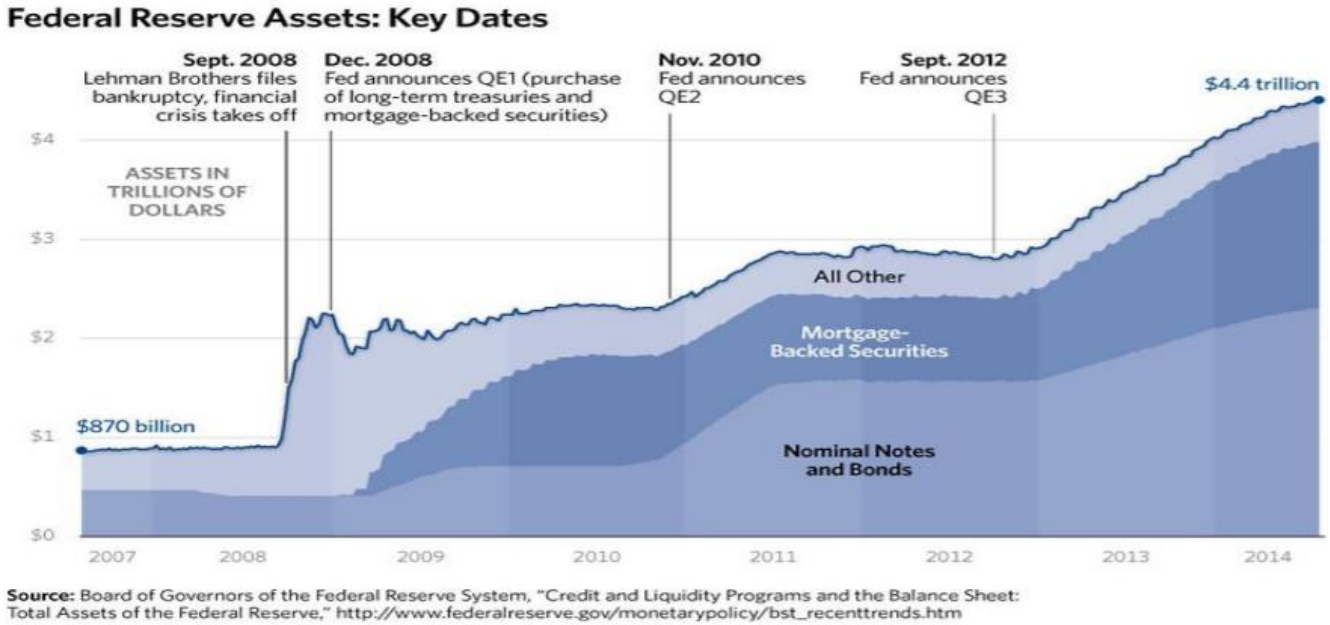


[1]

(Board of Governors of the Federal Reserve System)

This was only the beginning of many more rounds of QE by Federal Reserve. At the end of 2008, the Fed held approximately $800 Billion worth of financial instruments on its balance sheet, which wasn't enough to form balance in the hectic financial sector, so the Fed continued on with its asset buying program. By the start of 2010, the Fed's balance sheet had reached $2.1 trillion and an announcement of halting further purchases was made as the economy started to improve. The Fed's goal was to keep those $2.1 trillion in holdings, which meant roughly $30 billion of monthly purchases as part of the debt begin to mature. Not long after the announcement of halting further purchases Fed revisited its goals and announced a second round of quantitative easing (QE2) in November 2010. $600 billion of Treasury securities were bought by the end of second quarter of 2011. Third round of QE was introduced on September 2012. The Fed decided to launch a new $40 billion per month buying program of mortgage-backed securities. QE3 differed from earlier rounds in a way that it was open-ended, which is why it got the infamous nickname of "QE-infinity". In December 2012, these open-ended purchases were increased from $40 billion to a staggering 85$ billion per month. Monthly purchases of mortgage-backed securities continued until 29 October 2014 after accumulating $4.5 trillion in assets during QE1, QE2 and QE3.

Federal Reserve Assets: Key Dates



[2] (Board of Governors of the Federal Reserve System)

2.2 Covid-19 outbreak

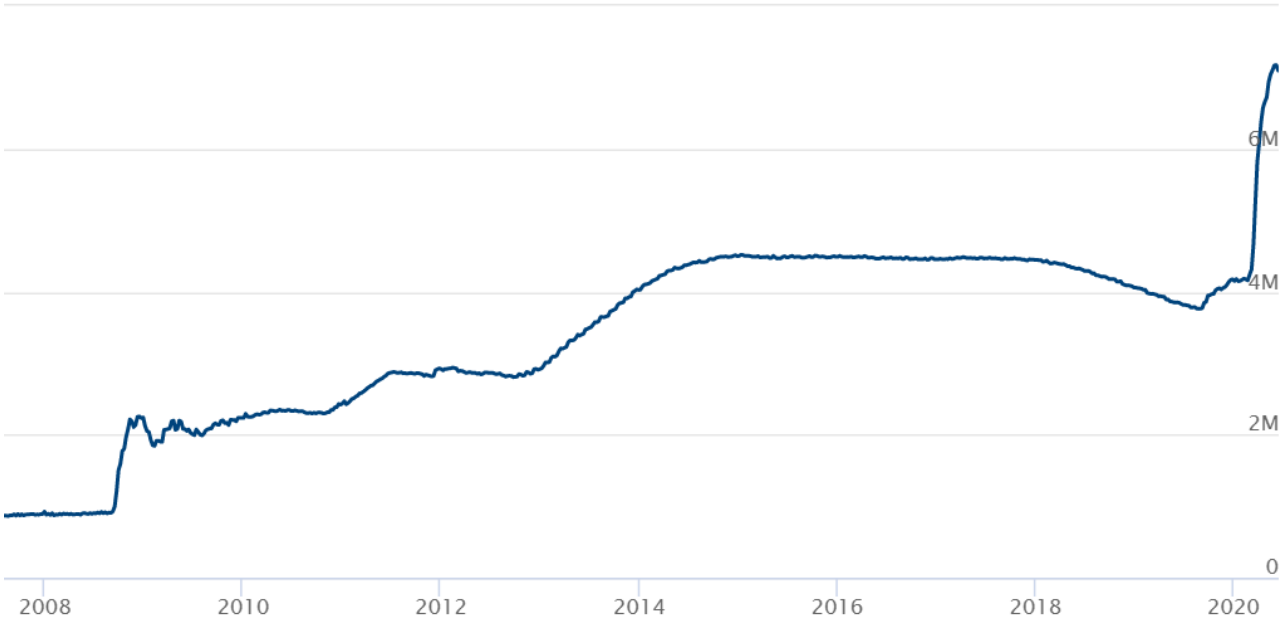
Asset buying programs were put on hiatus in late 2014 until recently when the notorious Covid-19 outbreak started infecting world economy. On March 15. 2020 the Federal Reserve announced a massive purchasing program of $500 billion in Treasury securities and additional $200 billion in mortgage backed securities over the next several months. These actions were not powerful enough to calm the markets as the pandemic had already severely damaged various parts of the society, so the Fed expanded their QE purchases to unlimited amount, which came as a shock to many commentators in the field. Economists and policy makers were partly divided in their reactions to the expansion of QE. Majority understood that the circumstances forced this outcome by the Fed and

By May 2020 Federal Reserve's balance sheet had grown to $7 trillion, $3 trillion alone in the first quarter of 2020. The chair of Federal Reserve Jerome Powell stated that he was not concerned about Fed's balance sheet and inflation would not be an issue. At the time of writing the US stock market is almost back at its all-time highs and the jobless numbers are curving down, one could say these actions have been effective at least on the short- run. The Fed announcing unlimited purchases has

sparked debates of QE program's sustainability amongst economists. The literature is not united about QE's net positivity or negativity, but most agree on the fact that future of these unconventional monetary policies is unpredictable.

While the unconventional monetary policies by the Fed were not expected to last forever, talks about tapering asset buying program in 2013 did surprise the market participants. Market experienced increased volatility during the "Tapering talks", which didn't only affect the US, but all financial markets were shaken, especially emerging ones. As the panic spread, investors focused on larger and more liquid markets, the "riskier" Emerging markets like Brazil, India, Indonesia and Turkey felt severe pressure in their financial systems. I will be elaborating more about the effects on emerging markets later in this paper.

The Federal Reserve Balance Sheet



[3] (Federalreserve.gov/monetarypolicy)

Graph above shows Federal reserve's balance sheet starting from early 2008 to April 2020. You can see the first growth period in 2008 – 2014 where QE1, QE2 and QE3 were implemented. Followed by steady period from 2015 – 2019 when some of the loans started to mature, and then the latest large purchases from Fed to stabilize economy during Covid-19 pandemic.

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In this paper I will study the effect of QE on US economy and how the effects have transitioned to emerging markets (EM's). The effects that are transitioned from QE inflicted by developed markets to EM's are called "spill over" effects describing their rather unintended nature. The main focus of this paper will be on the specific channels from which unconventional monetary policies affect the economy. This paper will be done as a literature review, and the focus will be on the US and especially emerging markets. Even though Quantitative easing effects on US and emerging markets are remarkably new subjects there has been comprehensive research being made by institutions and economist all over the world.

The available research suggests that QE has likely increased capital flows to EMs, but at the same time inflated asset prices and exchange rates in those markets (Lavigne, Sarker and Garima, 2014). Consensus is not united on the positivity or negativity of QE's overall effects on EM's, although literature is leaning towards a net positive effect due to the beneficial trade and confidence effects arising from stronger economic activity in the countries adopting QE. Fed's talks about tapering has had a negative effect on all EM's, capitalizing a short but sharp withdrawal of equity from all EM's. The literature I will be referring to include a study done by the Bank of Canada in 2014 "Spill over Effects of Quantitative Easing on Emerging-Market Economies", Lavigne, Sarker and Garima, which elaborates the link between QE and emerging markets. Other study I will be utilizing is Ben Bernanke, (Served two terms as the Chair of Federal Reserve during 2006 – 2014), and his speeches addressing unconventional monetary policies and QE from different perspectives. He is seen as one of the most respected economists in the field. Various other sources involving unconventional monetary policies and emerging markets economies will be used, including an empirical study "ECB Unconventional Monetary Policy Actions: Market Impact, international Spillovers and Transmission Channels", Fratzscher, Lo Duca and Straub (2013), which analyses the non-standard policy measures on asset prices and exchange rates in the euro area and globally. In addition, the paper tests for number of transmission channels from policies to international financial markets.

This paper will be structured in the following order. In the third section I will be introducing the channels from which QE generally affects the markets, developments that we have seen happen in the U.S markets. In the fourth section I will explain how QE effects EM's by utilizing the research I have gathered. In the fifth section I will be doing a case study on India's economy and show you exactly how QE has affected its markets. Finally, the sixth section will be including my conclusions and general discussion about the subject.

3. Literature review

3.1 Transmission channels for Quantitative Easing

The existing literature proposes several ways of identifying the potential transmission channels of QE to financial markets. Krishnamurthy and Vissing-Jorgensen (2011) test for number of transmission channels from which QE effects financial markets. These include duration risk, liquidity risk, safety premium, default risk and mortgage payment risk, and a signalling channel. Their study finds that US QE was transmitted to financial markets via the signalling channel, reduction of safety premium, while QE boosted expected inflation. Other studies

3.2 Confidence channel.

Central banks taking decisive actions by implementing QE help to restore confidence back in the financial system. With investors confidence improving, risk premia and uncertainty might decline, which has a positive effect on asset prices. Krishnamurthy and Jorgensen (2011) contemplate that the effect of QE on inflation expectations would lead to alterations of private sector's future policy. As an example, if forward looking household expect that current QE policy will improve employment and output, they would spend more in the future.

3.3 Bank credit risk channel.

As unconventional monetary policies try to address bank liquidity concerns, they might have an impact on credit risk due to interaction between credit risk and liquidity. Lower credit risk might ultimately boost asset prices by decreasing risk premia overall. Venkatamaran (2014) explains that in 2008 the purchase of $1.25 trillion worth of MSB was aimed at improving individual borrowing through the real estate market. This created substantial increases in their net worth through higher asset prices.

3.4 Government Spending.

QE implemented by the US has includes large purchases of government securities. Which implicates that the Fed is monetizing government debt and thus reducing the interest spending related to it. With lower government expenditure, it is possible for fiscal policy to reduce taxes and that way increase private spending. This was proven to be correct by Bernanke and Reinhart (2004) by suggesting that QE creates expectations of lower taxes in the future. Which would ultimately

lead to a greater consumption by the inverse relations between government taxes and consumer wealth.

3.5 Portfolio rebalancing effect.

The portfolio balance is a potential channel of transmission of asset purchases to asset prices across market segments and countries. (Bernanke, 2009). As central banks by a portion of the treasury and agency bonds and mortgage backed securities, investors move to substitute investments, resulting in balancing of their portfolios. More broadly, unconventional monetary policies affect risk premia and thus induce investors to rebalance their portfolios, ultimately having price effects on broader range of assets. (Fratzscher, Lo Duca and Straub, 2014)

The phenomenon of US based QE has been widely studied in the literature. Stoebel and Taylor (2009), Kohn (2009), Meyer and Bomfim (2010) and Gagnon et al (2011) are some of the main economist to have studied this field. They find that QE has been effective in lowering long term yields of the US bonds, which was one of the Fed's original goals for QE. In a similar note Gagnon et al (2011) found that the assets that were included in QE program experienced a decline in their yields by 120 basis points on average, which also supports Fed's intentions. Krishnamurthy and Vissing – Jorgensen (2011) also supported the claim and additionally found that QE led to suspicions of inflationary increase and therefore sharper declines in real interest rates. They also found that increase in inflationary expectations lead to a sharp decrease in nominal rates for long-term safe assets.

4. The effects of QE on Emerging Markets

The introduction of unconventional monetary policies, especially QE have sparked a debate between policy makers and academics about the spill over effects it has on emerging market economies (EM's). I will reassess the evidence of these mentioned spill over effects, which are external effects of QE that have real and financial impacts on EM's. Since 2008, when unconventional monetary policies were introduced, volatility of all markets has increased, and many things not seen before has happened. The literature is united on the fact that QE has had effects on EM's, but the magnitude and positivity/negativity of these effects is still a controversial subject. When reassessing the effects of QE to EM's, I will give great focus to capital-flows as they are the intermission from which cross-border financial effects are transmitted.

4.1 Transmission Channels

Several empirical studies in the field have attempted to distinguish the clear channels from which QE affects EM's, but due to its limited history it has been difficult to draw clear inferences. However, I will be looking into some of the possible transmission channels of QE to EM's, keeping in mind the similarities/unsimiliarities with the transmission channels of QE affecting US markets. Researchers like Lavigne, Sarker and Garima (2014), Venkatamaran (2014), Lim, Mohapatra and Stocker (2014) have examined the effects of QE on EM's and are suggesting several possible channels of transmission. Next, I will be revaluating some of the channels that the literature I found have suggested to be affecting EM's.

Venkatamaran (2014) suggests that the most direct channel of QE on EM's has been trough capital flows. I agree on the meaning of capital flows on EM's and QE's impact on capital flows. This works mainly through the portfolio rebalancing effect mentioned earlier in this paper, which drives investors to seek opportunities outside the domestic markets. Lavigne, Sarker and Garima (2014) also find capital flows as in portfolio rebalancing channel to be an important factor. They suggest portfolio rebalancing to lower risk premiums, boost asset prices and lower yields in EM's, which are seen to be positive drivers for the economy. Additionally, they found QE effecting through exchange rate channel and trade- flow channel. Exchange rate channel is based on the expectations of depreciation of U.S Dollar due to QE inflating supply. Depreciation in U.S Dollar could lead to weaker demand on foreign produced goods and this way negatively effect on EM's exports. Trade-flow channel on the other hand would boost demand of EM's exports as QE could increase domestic demand in the US, fully or partially negating the negative effects on exchange rate channel.

Lim, Mohapatra and Stocker (2011) are on the same note identifying capital flows as in portfolio rebalancing channel playing a major role. Additionally, they find liquidity channel as an important factor, as the buying of long- term assets increases the balance sheets of private banks. This would lead to previously liquidity-constrained banks to extend credit to investors, which in turn would lead to increased overall bank lending, including lending to EM's. In their study Lim, Mohapatra and Stocker (2011) consider the actions from Fed to create more confident atmosphere for investors as the Fed is signalling to keep rates low in the future, and thus capital flows to EM's would increase.

As you can probably see, these channels from which QE effects EM's have some of the same mechanisms as the channels that QE effects developed markets, such as the US. Portfolio

rebalancing channel affects similarly to U.S markets when compared to developed markets. Exchange rate channel is now looked at from EM's perspective, as it strengthens currencies compared to the US Dollar. Trade- flow channel is the consequence from strengthened economic activities in developed countries (US). I would like to point out that the channels mentioned are not

4.1 Capital Flows

As I stated before, capital flows are crucial information when evaluating the impact that unconventional monetary policies have on EM's. Capital flows to EM's are tightly correlated to changes in the portfolio balance channel, which was introduced earlier.

Lim, Mohapatra and Stocker (2014) studied the gross capital inflows to developing countries from 2000 to 2013, with focus on QE's impact on those inflows. They found that QE done by Federal reserve operates through portfolio balancing channel, liquidity channel and signalling channel, as I stated before. From 2005 to 2008 EM's experienced a steady rise in capital inflows, peaking to $650 billion in 2007, roughly a year before the crisis and initiation of QE1. During the crisis inflows plummeted heavily turning into outflows and reaching negative $200 billion alone in Q4 of 2008. However, in 2009 inflows came back sharply and reached pre-crisis levels in early 2010. This comeback was due to many actions from developed countries, which had implemented unconventional monetary policies, including Federal Reserve (QE1). In graph 3 is shown the visualization of Capital inflows to EM's, as well as interest rate growth differentials.

Periods of QE were followed by increased inflows of capital to EM's, in a similar fashion Frazscher, Lo Duca and Straub (2013) elaborated that purchases during QE2 initiated somewhat significant portfolio rebalancing between EM' and the US. This was seen as an increase in interest of capital towards EM's. They also found that the Fed's policies were launched to balance US business cycle and the capital flows that EM's gained from it were in fact pro-cyclical from the EM's perspective. Which could mean emerging markets were heated up even more in their financial up turn. Although it needs to be compared against the fact that without QE, EM's could have faced weaker demand for their exports. This means they have somewhat cancelling effects on each other.On the contrarian to the studies mentioned above, Ahmed and Zlate (2013) studied capital flows to EM's and did not find QE to have statistically significant positive effects on QE's capital flows. Instead they find that growth and interest rate differentials, and international risk appetite to be determinant factors.

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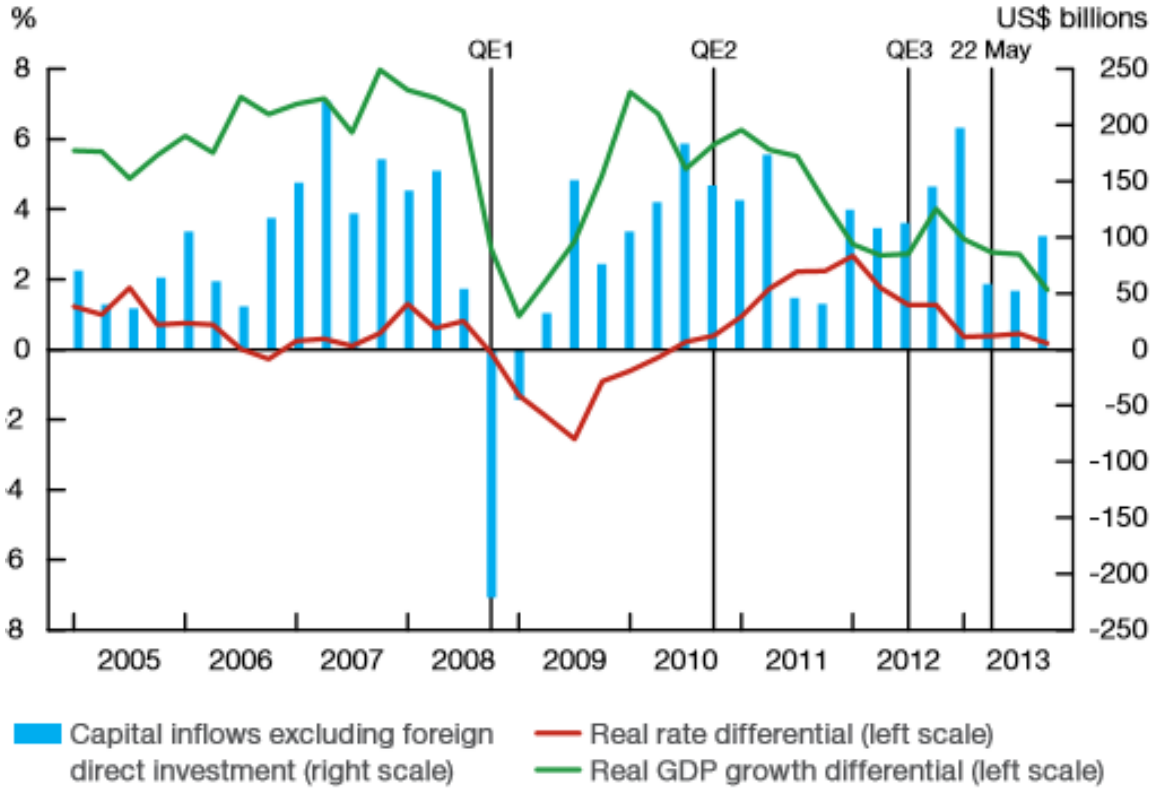
Capital inflows to emerging-market economies, and interest rate and growth differentials

Quarterly data



[4]

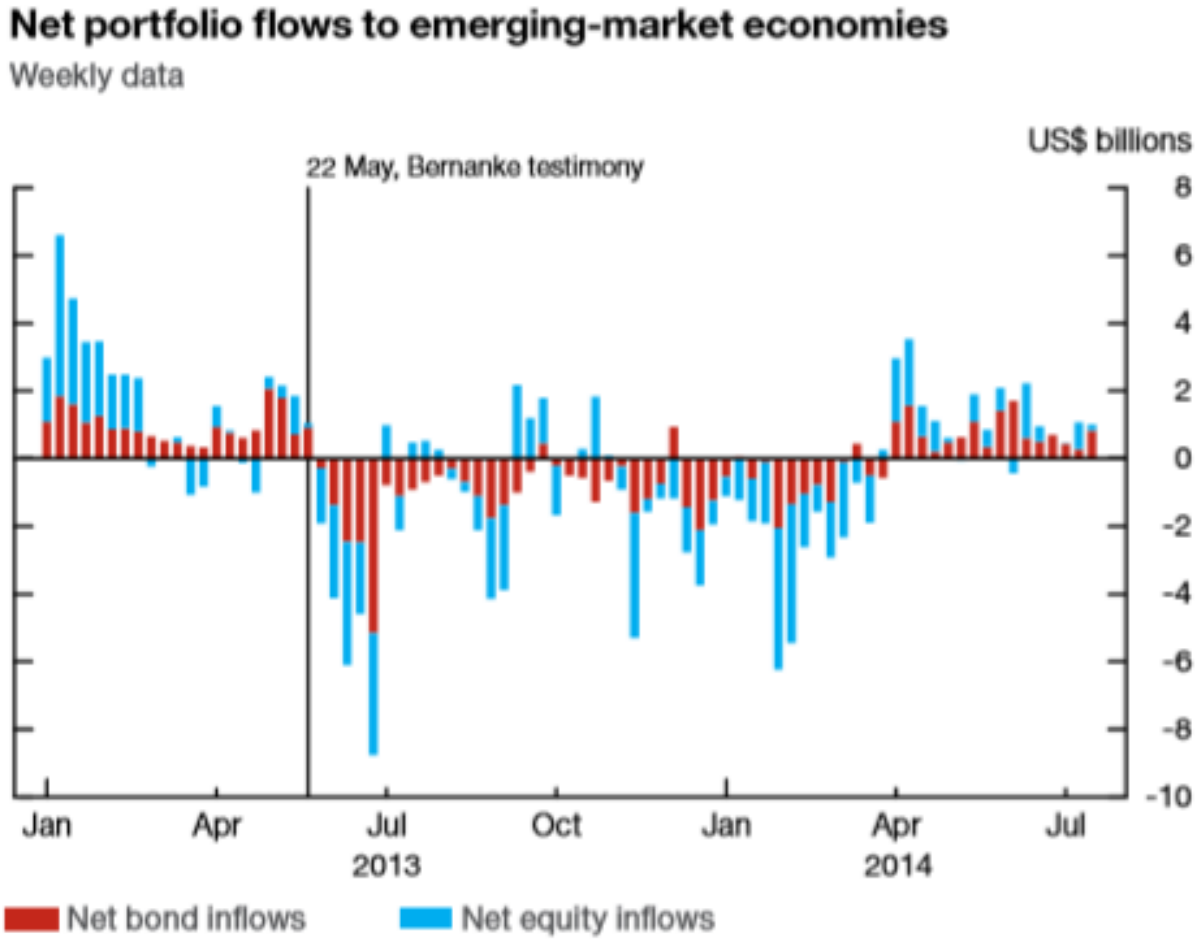
(Lavigne, Sarker, Vasishtha (2014))

Notes: Capital inflows include portfolio investments and other investments. The interest rate differential is calculated as the difference between PPP-weighted real interest rates of EMEs and advanced economies. The GDP growth differential is calculated as the difference between PPP-weighted real GDP growth of EMEs and advanced economies (PPP = purchasing-power parity).

4.3 Reaction to tapering of unconventional monetary policies

In May 2013, Federal reserve gave out first hints about tapering their security purchases. Reducing them from the $85 billion per month to something lower and possibly phasing them out completely in the future. It had a sharp negative effect in the financial conditions of EM's. These changes in policy expectations likely reduced the market participants risk tolerance and many EM's experienced a sharp withdrawal of private capital inflows and increased volatility in the markets (Lavigne, Sarker and Garima, 2014). The impact was not only sharp, but in the eyes of many commentators, it was surprisingly large.

Eichengreen an Gupta (2014), found EM's that allowed the largest appreciation of their real exchange rates and the largest increase in their current account deficits in the time before QE experienced the sharpest currency depreciation, reserve losses and stock market declines when talks about tapering begun. They also found that better fundamentals (the budget deficit, the public debt, the level of reserves, or the rate of economic growth) did not provide meaningful protection. The more determining factor of differential impact was the size of county's financial market. The countries with larger financial markets experienced more pressure on the exchange rate, foreign reserves and equity prices. Their conclusion was that investors were better able to rebalance their portfolios when a market has more liquidity and size. On the contrarian, Mishra, Moriyama, N'Diaye and Nguyen (2014) found that countries with better fundamentals and financial depth were less affected than others. They also found that having strong trade relations with China can help dampen markets reaction when no bad news originated from China. The literature concerning the effects of tapering and EM's fundamental values is partly divided, although consensus is leaning on the fact that better fundamentals weaken the effect of tapering. However, the literature is united about the fact that larger financial market and better liquidity does provide some relief against tapering.



[5]

(Lavigne, Sarker and Vasishtha)

4.4 Spill Backs from Em's to developed economies

Policy makers from developing countries have highlighted that the negative effects of QE in EM's would eventually "spill back" to developed economies (Rajan, 2014). Which seems like a good argument as the EM's represent a large and rising part of the global economy, there is growing evidence of spill backs from EM's to developed economies, primarily through trade, financial and commodity-price channels (Lavigne, Sarker and Vasishtha, 2014). Weak economic activity in EM's might lead to weaker demand for advanced economy exports as well as lower equity and commodity prices. A preliminary study by IMF suggests that the effects of these spill backs are potentially modest, thus could be greater in crisis periods. Moreover, these effects could be felt harder in advanced countries with greater trade exposure to EM's, such as Japan and the Euro area (IMF 2014). Additionally, lower commodity prices may affect negatively on major commodity exporters, such as Canada and Australia. Commodity prices may decline due to slowing growth in EM's that are major commodity consumers (Lavigne, Sarker and Vasishtha, 2014).

Due to concerns about spill overs and associated spill backs, many commentators in the field are stressing the need for central banks to factor in the effects of their policies on other countries and have a greater co-ordination of international monetary policy. However, the Federal Reserve has stated that it does pay attention to the global spill over effects of its policies and associated spill backs within the context of its domestic mandate. Lavigne, Sarker and Vasishtha (2014) also stress the importance of emerging markets policy reactions to QE, such as an increase in sterilized foreign exchange rate intervention, stricter macro-policy measures and a greater use of capital controls.

5. Case India

I will elaborate the subject more by doing a case study on how QE by the Federal reserve affected India's economy and financial status. I will dive into more detail on its economic progress during QE periods. It will give more practical stance on QE's effects on EM's.

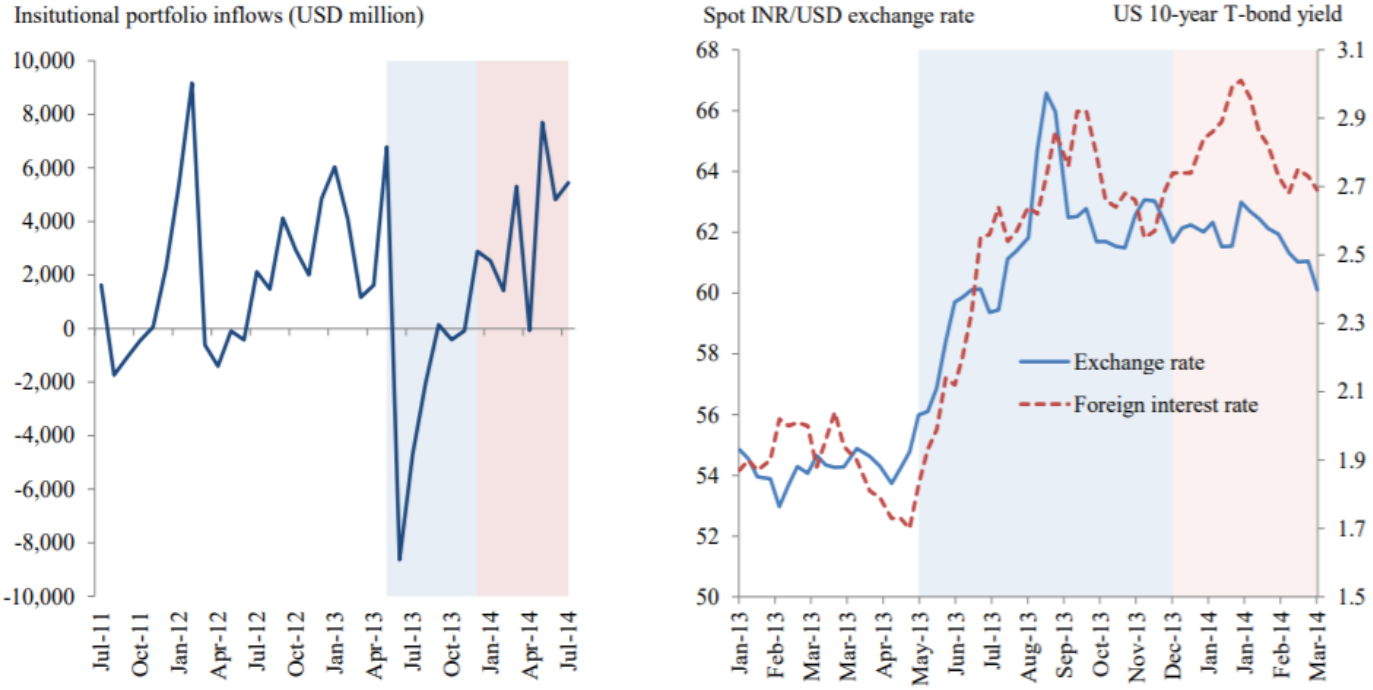
India as a small open economy experienced many changes during QE period, although it is not certain that these changes were the consequences of QE. When assessing whether economic events in India paralleled that of the US, it is important to note that India is one of the few EM's where the financial crisis was slower in its reach, Venkataramanan (2014). This could be mainly due to domestic policies by India. Mohanty (2009) further illustrated that India was largely unaffected by the first wave of financial crisis due to the fact, that their banks had very little exposure to the toxic assets, which were the cause of the crisis. Furthermore, the financial crisis was eventually felt through trade, finance and confidence channels. Venkataramanan (2014) conducted a VAR analysis to examine the relationship between Us Monetary Policy variables and Indian macroeconomic variables. He found out that the currency channel was the first to be impacted. The effect of federal funds rate and QE purchases on the Indian repo rate suggest that unconventional monetary policies have effects on India and possibly other EM's as well. The actions made by the Bank of India seemed counter- cyclical to changes in US Monetary Policy with alternating positive and negative responses, which chimes with the claim about Fed's monetary policies being pro- cyclical for EM's economies, Fratzscher, Lo Duca and Straub (2013). Further, these counter- cyclical responses suggest overshooting by the Bank of India to the changes in US Monetary Policy.

Other studies suggest that the effects of unconventional monetary policies to Indian economy have been non-existent or minimal at most. Banerjee and Basu (2014) predict that QE raises the real marginal production cost in the home country, which translates into inflation trough the standard ne Keynesian Phillips curve channel. Although their viewpoint is that, it doesn't have real

macroeconomic effects on the Indian economy and their analysis suggests that the effect of QE shock in the real GDP is rather minimal.

The tapering announcement on spring 2013 had some rapid effects on Indian economy, especially on currency rates. A study by Ikeda, Medvedev and Rama (2015) explained how the "tapering talk" set in motion a wave of fund withdrawals from investors, which considered EM's to be most vulnerable to the end of "easy money", including India. It naturally was predicted by investors that countries with weaker macroeconomic prospects would be more severely affected. On the contrarian Ikeda, Medvedev and Rama find that those concerns might have been overstated. Most of the Indian Rupee depreciation in 2013 was accounted for by the tapering announcement, the 10-year U.S T-bond yield was the most determinant factor of exchange rate dynamics only during the tapering period. After tapering period was over it was not statistically significant determinator of INR/USD variations, which speaks for the fact that investors over-reacted during talks about tapering.

Figure 2: Financial sector volatility after the tapering talk



[6] (Ikeda, Medvedev and Rama (2015))

6. Conclusions and discussion

The domestic effectiveness of QE and its international spill overs have dominated the policy discussion over the recent years. This paper's goal was to identify the mechanisms from which these unconventional monetary policies effect global markets, emerging markets in particular as they are more vulnerable to changes in US policies due to the smaller size of their markets. Capital flows turned out to be one of the most important factors when assessing effects of QE on EM's and it seems that QE is supporting capital flow to the EM's by portfolio rebalancing channel. Furthermore, logically tapering of Fed's purchases seems to effect negatively on capital flows. The most recent developments of QE during Covid-19 pandemic is what got me interested in this subject, but since very little literature has been published about it yet, I could only lightly grasp it.

Given the available evidence, QE has boosted US economy in the times of crisis. Over $7 trillion of securities purchases have increased liquidity in the banking sector, given confidence for the investors and improved governments fiscal prospects. Increased economic activity due to QE has also spread to EM's, by increasing capital flows towards them and as importantly increase in foreign demand has been proven to improve EM's exports.

Nonetheless, increased volatility is in the books for EM's whenever developed countries begin to normalize their monetary policies, highlighting the need for policy makers in advanced economies and EM's to remain vigilant. Communication is key if policy makers will want to prevent 2013 like panic from happening. They will have to shape market participants expectations in a way that tapering of Fed's funds will not come as a surprise and cause mass hysteria. Although some level of capital-flow reversal and higher lending costs are to be expected even if tapering is managed to the perfection.

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Graphs:

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